NOTE V.

ON SOME SPECIES OF THE GENUS SESARMA SAY AND CARDISOMA LATR.

BY

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I. Sesarma Say.

1. *Sesarma gracilipes*, M. Edw.

Milne Edwards, Observ. sur la classification des crust., in Annal. des sciences natur: III Série, t. XX, 1853, p. 182. — Heller, Novara-Reise, Crustacea, pag. 65.

The Museum contains two specimens (1 ♂, 1 ♀) of this small species.

The female specimen is a little larger than the male.

Breadth of carapace of the female 19 mm., length 17 mm.

Breadth of carapace of the male 15 mm., length 13½ mm.

Carapace a little convex, somewhat narrowing anteriorly, with a few distinct regions; upper surface somewhat rugose anteriorly and everywhere very minutely punctate. Behind the acute external orbital tooth, there are still traces of two very rudimentary teeth. Front narrow, a little less broad than half the width of the anterior part of the carapace, vertically deflexed, with a nearly straight, very slightly emarginated anterior margin. Postfrontal lobes abrupt, sharp, the median lobes broader than the external. Anterior legs equal, larger in the male than in the female;

inferior margin of the arm a little dentate, upper margin entire; upper surface of the wrist granulated, inner angle not toothed; hands swollen up, with a large tubercle on the granulated external surface; upper surface with an external marginal ridge and several abrupt short ridges more internally; inner surface also a little granulated, upper margin of the mobile finger provided with numerous minute teeth. Ambulatory legs very slender, especially the meropodites; the three last joints, especially the slender dactylopodites, somewhat hairy. Penultimate joint of the male abdomen more broad than long. These specimens have been collected by Mr. von Rosenberg at Andai in New-Guinea.

The Museum contains still another specimen, collected at Amboina, a male, somewhat smaller than the preceding ones. This specimen agrees completely with the described forms, but the small teeth behind the external orbital angle are more distinctly developed; the front, though as narrow with regard to the breadth of the carapace, is however deeper in proportion to its breadth and has a convex anterior margin. I think this specimen to be only a variety of *Sesarma gracilipes*.

Width of the carapace $12^1/_2$ mm., length 11 mm.

2. 3. *Sesarma picta* de Haan and *Sesarma affinis* de Haan.

De Haan, Fauna Japonica, Crustacea, pag. 61 and 66. Milne Edwards, l. c. pag. 183 and 184. Hilgendorf, in »Baron von der Decken's Reisen in Ost-Afrika", Crustac. pag. 90.

Mr. Hilgendorf thinks these species not only to be identical with one another, but also with *Sesarma quadrata* Fabr.; it may be possible that either of them may be identical with the *Ses. quadrata*, though I think it improbable, but the two Japanese species are certainly different. *Sesarma picta* de Haan has a quadrate carapace, *as broad anteriorly as posteriorly, with parallel, nearly straight lateral margins; front*

half as broad as the carapace; the penultimate joint of the male abdomen much broader than long, and the terminal joint scarcely half as broad as the preceding. In *both* species the distal end of the inferior margin of the arm is armed with a spine, but this spine is somewhat more distinct in *Ses. affinis*. Upper margin of the mobile finger provided with fifteen transverse oval tubercles.

Sesarma affinis de Haan, on the contrary, has a more convex carapace, *broader anteriorly than posteriorly; lateral margins not being parallel, but converging backwards to one another; front broader than half the space between the two external orbital teeth*; the penultimate joint of the male abdomen less enlarged, though being also more broad than long; and the terminal joint half as broad as the preceding. Upper margin of the mobile finger provided with seven circular tubercles. Meropodites of the ambulatory legs more enlarged than those of *Ses. picta*. Both species therefore may also be distinguished, besides by the characters given by Mr. de Haan, at first sight *by the quite different shape of the carapaces.*

Breadth of carapace of *Sesarma picta* (♂) 23 mm., length 19 mm.

Breadth of carapace of *Sesarma affinis* 25 mm., length 19 mm.

4. *Sesarma eydouxi*, M. Edw.

Milne Edwards, l. c. pag. 184. Heller, l. c. pag. 64.

There are three male specimens in the Museum, of which it is unknown, where they have been collected.

Body tolerably thick; carapace of the largest specimen 33 mm. broad, and 27 mm. long, with a little convex surface and tolerable distinct regions; these are a little rugose and covered with small tufts of hair.

Front nearly vertically deflexed, with passably deep median sinus; four little prominent postfrontal lobes, of which the median ones are scarcely broader than the two external. There is still a trace of a second tooth behind the

external orbital angle; branchial regions with several oblique lines. Anterior legs equal in size; arm with a little developed tooth at the distal end of its upper margin, lower margin somewhat toothed. Outer surface of the wrist rugose and granulated, with a tolerably sharp spine at the inner angle. Outer surface of the hands smooth, with a minutely denticulated marginal ridge on the upper margin and a little distinct small smooth ridge on the middle of the external surface; inner surface of the hands granulated. Upper margin of the mobile finger with 13—15 obtuse spiniform tubercles. Ambulatory legs short and broad, with very enlarged meropodites. Penultimate abdominal joint of the male much more broad than long.

5. *Sesarma rotundifrons* Alph. M. Edw.

Alph. Milne Edwards, Nouv. Arch. du Mus. t. V. Bulletin, pag. 30.

A male specimen, collected at the island of Xulla-Bessy and a female found by Messrs. Pollen and van Dam at the island of Nossi-Bé, near Madagascar.

Description of the male Xulla-Bessy specimen:

Carapace more broad than long, *very convex* longitudinally, regions little distinct, separated by shallow grooves; postfrontal lobes rounded, scarcely prominent, the front not being covered by them when looked at from above. Front nearly vertically deflexed with two obtuse lobes, separated by a wide median sinus; internal orbital angles sharp, acuminate. Numerous transverse tufts of hair upon the anterior part of the surface of the carapace; branchial regions also a little hairy. Carapace somewhat broader anteriorly than posteriorly; the lateral margins a little arched; behind the acute external orbital angle another second prominent tooth. Penultimate joint of the abdomen rather more long than broad. Anterior legs almost equal in size; upper margin of the arm entire, without tooth; lower margin arched and subtilly denticulate. Outer surface of

the arm rugose. Upper surface of the wrist granulated, internal angle obtuse without a tooth. Hands with punctate external surface, upper margin rounded without elevated ridges or lines; upper margin of the mobile finger covered with numerous small granules; internal surface of the hands granular, without granulated ridges. Ambulatory legs very short, with tolerably enlarged meropodites and closely hairy terminal joints.

Breadth of the carapace 35 mm., length 29 mm.

The female specimen, described by Mr. Hoffmann (Crustacés de Madagascar, pag. 23) as belonging to *Sesarma tetragona* Fabr., agrees almost entirely with the Xulla-Bessy specimen; but the upper surface of the carapace is somewhat less hairy, the hands a little smaller and unequal, the right one being larger; the interior surface presents a granulated ridge, which however seems not to be constantly present in all individuals, according to Mr. Hoffmann.

This species is certainly *nearly allied* to *Sesarma tetragona* M. Edw. (Nouv. Arch. du Mus. t. IX, pag. 304), *but the carapace is comparatively broader, more convex and the postfrontal lobes are more rounded and less prominent.* For the rest it were to be wished that Mr. Alph. Milne Edwards had described this species a little more extensively, for in that case it would have been possible to state more differences between these two *Sesarmae.*

6. *Sesarma intermedia*, de Haan.

De Haan, Fauna Japonica, Crust. pag. 61, pl. XVI, fig. 5. — Milne Edwards, l. c. pag. 186.

This species is closely allied to *Sesarma tetragona* M. Edw. (Nouv. Arch. du Mus. t. IX, pag. 304), but may be distinguished by the following characters. There is a slight trace of a third tooth behind the epibranchial tooth of the lateral margins of the rather little convex carapace. The regions are defined by rather shallow grooves, the

postfrontal lobes are little prominent, and do not hide the front, the anterior margin of which is deeply emarginate. The penultimate joint of the abdomen of the male is more broad than long. Outer surface of the hands a little granular; for the rest the anterior legs, like the ambulatory ones, seem to resemble very much those of *Sesarma tetragona.*

The Museum is also in possession of a male specimen of another *Sesarma*, from Japan, that agrees almost entirely with *Sesarma intermedia*, but differs by a *comparatively broader and more convex carapace*, and by a less emarginated front. The rounded postfrontal lobes are also a little more prominent. Perhaps this specimen belongs to *Sesarma sinensis* M. Edw., but the description of this species is so extremely short, that it is quite *impossible* to identify this form. The breadth of carapace of this specimen is 28 mm., the length 23 mm.

7. *Sesarma taeniolata*, White.

White, List Crust. Brit. Mus. p. 38. (1847). Miers, On some Crustaceans from Duke- of- York Island, in Proc. Zool. Soc. 1877, pag. 137, note. Synon: *Grapsus, Pa. chysoma, fascicularis* de Haan (nec Herbst), and *Grapsus, Pachysoma, tetragonus* de Haan (nec Milne Edwards), Fauna Japon. Crust. pag. 61.

Body tolerably thick, carapace quadrate, rather little convex in the male, a little more in the female, with rather parallel, nearly straight lateral margins; there is a second, somewhat smaller tooth behind the acute external orbital angle. Front nearly vertically deflexed, the anterior margin sinuated, the median sinus wide; postfrontal lobes four, rather little prominent, the external a little smaller than the median ones; the groove defining the gastric region deep; the whole surface of the carapace, especially anteriorly, closely covered with small tufts of hair. Penultimate joint of the male abdomen much more broad than long,

the last joint not half the width of the preceding. Anterior legs robust, those of the male much larger than of the female, equal in size; arm with a very strong tooth near the distal extremity of its upper margin; lower margin somewhat denticulated; carpopodite closely covered with granules or small tubercles, with granulated internal margin, but not toothed. Outer surface of the hands granulated, with a slight granular line rather on the middle; outer surface of the fingers almost smooth; upper margin of the hands with a longitudinal, comb-like, closely pectinated ridge; mobile finger with a longitudinal ridge on its upper surface with about fifty to sixty transverse striae; inner surface of the hands with a very prominent, very granulated crest. Ambulatory legs short, coarse, with rather much enlarged meropodites and slightly hairy.

Breadth of carapace of the male 40 mm., length 36 mm.

Breadth of carapace of the female 37 mm., length 32 mm.

According to our authentic specimens from Java, this species was considered by de Haan to belong to *Sesarma fasciculatis* Herbst or *Sesarma tetragona* Fabr. According to Mr. Hilgendorf however, these species are quite different, *Sesarma fasciculatis* Herbst being distinguished at first sight by the nine tubercles on the upper margin of the mobile finger; *Sesarma tetragona* M. Edw., according to the description, given by Mr. Alph. Milne Edwards (Nouv. Arch. t. IX, p. 304), differs by the want of ridges on the upper surface of the hands, by the upper margin of the mobile finger not being provided with a subtilly striated longitudinal ridge, by the absence of a spine at the distal end of the upper margin of the arm, by the shape of the penultimate joint of the male abdomen etc.

Our specimens of *Sesarma taeniolata*, which have been collected at the island of Celebes, agree also *entirely* with the description given by Mr. Miers, except that of the carapace, which he says is *very* convex; the difference is however merely subjective; nor makes he mention of the carapace being covered with tufts of hair.

8. *Sesarma bocourti*, Alph. M. Edw.

Alph. Milne Edwards, Nouv. Arch. du Mus. t. V. Bullet. p. 28.

Though Mr. Milne Edwards's description is again very short and imperfect, I will however refer a specimen of our collection to this species. Moreover I will give a more extensive description of it. Our specimen, a male, has a rather regular tolerably convex carapace, which is somewhat hairy and covered, at least anteriorly, with oblique wrinkles; the branchial regions also are a little covered with small hairs. The lateral margins are parallel and the regions are defined by rather deep grooves. Front vertically deflexed with a slightly emarginate anterior margin. Postfrontal lobes tolerably prominent and sharp, not rounded, the external ones being but a little narrower than the median ones. There is another second smaller tooth behind the external orbital angle. Penultimate joint of the abdomen more broad than long; the sides of the abdomen being rather a little convex. Anterior legs very characteristical: the upper margin of the arm without a spine at its distal end, the inner margin toothed and the outer surface rugose; upper surface of the wrist granulated, its inner margin not being denticulate; *hands very high, compressed and distorted*, their outer surface being *concave* with a rather sharp granulated lower margin; the whole outer and inner surface of the hands and of the mobile finger closely granulated, the inner surface without a granulated ridge. Ambulatory legs short, with tolerably enlarged meropodites, the last joints but little hairy.

Breadth of carapace 24 mm., length 21 mm.

Our specimen was collected at the island of Borneo, that of Milne Edwards at Bangkok (Siam).

9. *Sesarma bidens*, de Haan.

Grapsus, *Pachysoma*, *bidens* de Haan, Fauna Japon.

Crust. p. 60. Milne Edwards, l. c. pag. 185. Heller, Novara-Reise, p. 64. — Hilgendorf, l. c. pag. 91.

The Museum contains, besides the types described by Mr. de Haan, a fine series of specimens, collected at Amboina; these specimens agree almost entirely with the Japanese types, but the first joint of the male abdomen is higher (longer) in the type than in the Amboina specimens, the two first joints being about equally short in these Indian samples.

This species is distributed throughout the Indo-Pacific region, being also found at Zanzibar (Hilgendorf).

10. *Sesarma africana*, M. Edw.

Milne Edwards, l. c. pag. 185. Herklots, Addit. ad Faun. Afr. occ. pag. 9.

This species resembles in some degree the Indian *Sesarma rotundifrons* Edw., but the antero-lateral margins of the less enlarged, more quadrate carapace are nearly parallel and are provided with a very rudimentary tooth behind the epibranchial one; the penultimate joint of the male abdomen is much more *broad than long*, in *rotundifrons* rather more long than broad. Upper surface of the hands of the male with a feeble, minutely pectinated line, inner surface with a prominent, very granulated ridge, upper margin of the mobile finger provided with 18—20 rather large tubercles; upper margin of the arm at the distal end with a sharp spine, which is not found in *S. rotundifrons*, the anterior margin of the wrist more denticulate.

11. *Sesarma smithii*, M. Edw.

Milne Edwards, Arch. du Mus. t. VII. pag. 149. Alph. Milne Edwards, Nouv. Arch. du Mus. t. IX, pag. 305.

There are specimens in our collection from Java, Tondano and Nossi-Faly (near Madagascar).

The Java specimen, a male, has a carapace of 37 mm.

in breadth; tufts of hair large and numerous, especially on the anterior part of the carapace; upper margin of the mobile finger with three black spines, the hindermost being rudimentary.

The specimen from Nossy-Faly, a female, 24 mm. broad, has the carapace nearly without tufts of hair.

The terminal joint of the abdomen of young female specimens is comparatively less profoundly pushed into the preceding than that of adult specimens.

12. *Sesarma* (*Holometopus*) *aubryi*, Alph. M. Edw.

Alph. Milne Edwards, Nouv. Arch. du mus. t. V. Bull. pag. 29 and t. IX, pag. 307. Miers, Proc. Zool. Soc. 1877, pag. 137.

There is a very fine adult male specimen in the collection, found at Amboina. To what has been mentioned by Messrs. Milne Edwards and Miers, about this species we wish to add that —

Though the carapace is generally smooth, the swollen epibranchial regions are a little rugose and obliquely wrinkled; the front is nearly vertical and granulated, comparatively higher than that of *Ses. Holomet. haematocheir* de Haan, with an entire arched anterior margin; in the Japanese species this margin is straight and a little reflexed upwards. The lateral margins of the carapace end about above the third pair of legs in *Ses. aubryi*, but in the other species above the fourth pair. Anterior margin of the arm of the anterior legs entire; in *Ses. haematocheir* it is delicately toothed. In the latter species the upper margin of the meropodites of the ambulatory legs is provided with a small sharp spine near its distal end, which is not found in *Ses. aubryi*. Finally the penultimate joint of the male abdomen of *Ses. aubryi* is comparatively broader and less high than that of *Ses. haemato-*

cheir, the sides of the abdomen being less distinctly concave, as has been said already by Mr. Miers.

Breadth of carapace 24 mm., length 21 mm.

13. *Sesarma violacea*, Herklots.

Herklots, l. c. pag. 10. Milne Edwards, l. c. pag. 190.

This species is identical with *Metagrapsus curvatus* M. Edw., (Milne Edwards, Arch. du mus. t. VII, pag. 160, pl. X, fig. 3).

Mr. Herklots did not describe the structure of the external maxillipeds, nor the form of the female abdomen. This may have been the reason, why Milne Edwards could not determine the position of this species in his system; — the type, described by Mr. Herklots, agrees however entirely with the description of *Metagrapsus curvatus* M. Edw. According to Mr. Milne Edwards, this species inhabits the Senegal, our specimens being collected at Boutry and at Saccondi.

14. *Metagrapsus punctatus*, Alph. M. Edw.

Alph. Milne Edwards, Nouv. Arch. du Mus. t. IX, pag. 308, pl. XVII, fig. 2.

Our collection contains one almost adult male specimen from Padang; breadth of the carapace $26^1/_2$ mm., length $20^1/_2$. This specimen agrees almost entirely with the description of the New-Caledonian type, but the meropodites of the ambulatory legs seem to be a little less slender and comparatively broader than those which are figured in the »Archives".

II. Cardisoma Latr.

15. *Cardisoma carnifex*, Herbst.

Herbst, Krabbe und Krebse, pl. XLI, fig. 1. Milne Edwards, l. c. pag. 204.

The Museum contains specimens of this beautiful crab from Madagascar, Java and Xulla-Bessy, which agree entirely with one another; according to Mr. Heller (Novara-Reise) it occurs also at the Nicobar islands and Mr. Alph. Milne Edwards has described specimens from New-Caledonia, so that it is evident that its range extends over the whole Indo-Pacific region.

Carapace more broad than long, very convex longitudinally; lateral margins defined by a distinct arched marginal line, which is continued tolerably far backward beyond the very small epibranchial tooth; the latter being placed at a very short distance behind the external orbital angle. Branchial regions rather little swollen up. Orbits large, transverse, *twice as broad as high*, almost as broad as the front; the inferior external orbital angle almost right and rounded. The internal suborbital lobe that separates the external antennae from the front, triangular and acuminate. The first joint of the external antennae *enlarged*, with the summit emarginate for the insertion of the other joints. Lower lateral surfaces of the carapace wrinkled. Anterior legs unequal, either the right or the left being larger; the hand of the larger leg scarcely as long as the width of the carapace; outer margin of the arms granulated. — Upper margin of the meropodites of the ambulatory legs armed with a small spine at the distal end.

16. *Cardisoma armatum*, Herklots.

Herklots, Addit. ad Faun. etc. pag. 7.

This species is closely allied to *Cardisoma carnifex* Herbst and may only be distinguished, except by the very characteristic anterior legs, by the fact that the orbits, though most resembling those of *carnifex*, are a little higher in proportion to the breadth. Carapace longitudinally convex, branchial regions very little swollen, the raised line, defining the lateral margins, very distinct. The size and situation of the epibranchial tooth, the form

of the first joint of the external antennae and the shape of the internal suborbital lobe that separates the antennae from the front, agree entirely with the same parts of *C. carnifex*. Anterior legs unequal, hand of the larger leg almost as long as the breadth of the carapace. Lower and outer margins of the arm armed with numerous teeth, upper margin transversely wrinkled. Upper surface of the wrist, as also upper and lower surface of the hand granulated; external surface of the hand a little granular. In the same manner the upper margin of the mobile finger and the lower margin of the index are provided with numerous granules. Ambulatory legs wholly resembling those of *C. carnifex* Herbst.

17. *Cardisoma urvillei*, M. Edw.

Milne Edwards, l. c. pag. 304.

A very fine male specimen was collected by Mr. Forsten in the Moluccas.

This species is also closely allied to *Cardisoma carnifex*, but differs by the following characteristics: Carapace comparatively a little broader with *very tumid* branchial regions, *no trace of a raised line defining the antero-lateral margins.* Orbits transverse, as broad as the front, but *comparatively higher* than those of *C. carnifex*, though having the same shape. The internal suborbital lobe and the first joint of the external antennae having a striking resemblance to the same parts of the common species. Anterior legs unequal, the left being larger; the hand of the larger leg *much longer* than the breadth of the carapace. External and internal surfaces of the hands quite smooth; fingers curved, especially those of the large hand, so that, when closed, they do not rest upon each other, somewhat granulated at their ends. For the rest this species agrees entirely with *Card. carnifex.*

Breadth of carapace (the swollen lateral parts of the body included) 90 mm., length 67 mm. Length of the hand of the larger leg 110 mm.

18. *Cardisoma hirtipes*, Dana.

Milne Edwards, l. c. pag. 205.

The Museum contains many beautiful specimens from the islands of Amboina, Ternate and Morotai.

This species differs in many regards from *Cardisoma carnifex* Herbst and the allied forms (*Cardis. urvillei* M. Edw. and *Cardis. armatum* Herklots) and may be characterised in this manner —

Carapace but little more broad than long, convex longitudinally; with rather little tumid branchial regions; lateral margins defined by a very distinct and arched raised line, which is continued but at a short distance beyond the middle of the lateral margins. Lateral surfaces of the carapace provided posteriorly with numerous oblique lines. Postfrontal lobes more prominent than those of *Cardis. carnifex*. Anterior part of the carapace behind the orbits near the raised lateral lines a little granulated. *Epibranchial tooth very small, situated at a relatively greater distance behind the external orbital angle than in the former species.* Orbits *rather little prolongated transversely, less broad than the front and comparatively higher than those of Cardis. carnifex* Herbst. Inferior external orbital angle *acute, directed backward.* First joint of the external antennae *about as broad as high with a truncated summit*; internal suborbital lobe that separates it from the front, triangular, acuminate. Pterygostomian regions more extensively covered with hairs than those of *C. carnifex* Herbst. Anterior legs almost equal, very short; external margin of the arm granulated, sometimes also the lower margin; upper margin obliquely wrinkled. Upper surface of the wrist a little granulated, and likewise the upper margin of the hands.

The hand of the larger leg scarcely as long as the breadth of the carapace. Ambulatory legs as in *Card. carnifex* Herbst.

Breadth of carapace (♂) (between the raised lateral lines)

55 mm., length 47 mm. Length of the hand of the larger leg 45 mm.

Breadth of carapace (♀) 60 mm., length 48 mm.

19. *Cardisoma obesum*, Dana.

Milne Edwards, l. c. pag. 205.

There are two specimens of *Cardisoma* in the collection, collected at the island of Sumatra, which I think I may refer to the species described by Mr. Milne Edwards. These specimens agree in the most essential characteristics with *Cardisoma hirtipes* Dana, as regards for example, the relative situation of the almost invisible epibranchial tooth, the form and size of the orbits and the very much hairy pterygostomian regions; but the carapace is comparatively much more enlarged, the branchial regions are very tumid and there is no distinct raised lateral line defining the lateral margin.

The very convex lateral surfaces of the carapace are smooth. Anterior legs nearly equal, hands as long as the breadth of the carapace, arm and wrist entirely smooth. In one specimen from Padang the fingers are widely separated, in the other, collected in the northern part of Sumatra, scarcely at all; I think these variations to be individual.

The first joint of the external antennae is somewhat more enlarged than that of *Card. hirtipes*, but not in such a degree as in *Card. carnifex*. Breadth of carapace (♂) (the tumid lateral parts of the carapace included) 83 mm., length 65 mm. Length of the hand 85 mm.

This form bears evidently the same relation to *Card. hirtipes* as *Card. urvillei* does to *Card. carnifex*.

There is one more beautiful male specimen of *Cardisoma* in the collection, that agrees almost entirely with *Card. obesum*, but the branchial regions are still more tumid, in such a degree, that the middle part of the carapace is *concave*.

I cannot decide whether this form belongs to a proper species or not, though I think it to be probable; the an-

terior legs are robust, equal in size; the hands scarcely as long as the breadth of the carapace; the outer surface of the hands punctate, and their lower margin a little granular.

Breadth of carapace (the tumid lateral parts included) 95 mm., length 67 mm.

This specimen was collected at the island of Morotai by the late Mr. Bernstein.

LEIDEN, November '79.